Cognitive deficits in children with cancer before and after treatment

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Introduction

Children with brain tumors (BT) often feature cognitive problems after medical treatment such as surgery, radiation, and/or chemotherapy. Results of a few empirical studies indicate that a variety of functional deficits can already be present before the start of treatment. Children with cancer not involving the central nervous system are not expected to show disease-related cognitive problems. Since they are usually exposed to a comparable level of emotional and physical distress, they serve as a well-balanced control group (CG) in the analysis of cognitive performance of children with BT. Thereby the impact of the disease itself on cognitive functions can be distinguished from the effects of the following treatment.

Participants & Methods

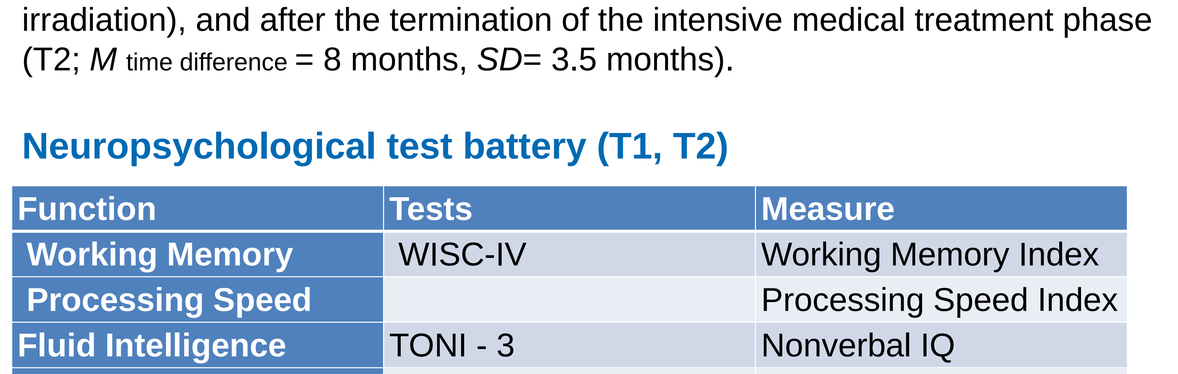
We analyzed an array of cognitive functions in 20 children with BT and 27 control patients.In both groups, tests were administered at diagnosis (T1), (i.e. before any therapeutic intervention such as surgery, chemotherapy or irradiation), and after the termination of the intensive medical treatment phase (T2; *M* time difference = 8 months, *SD*= 3.5 months).

Neuropsychological test battery (T1, T2)

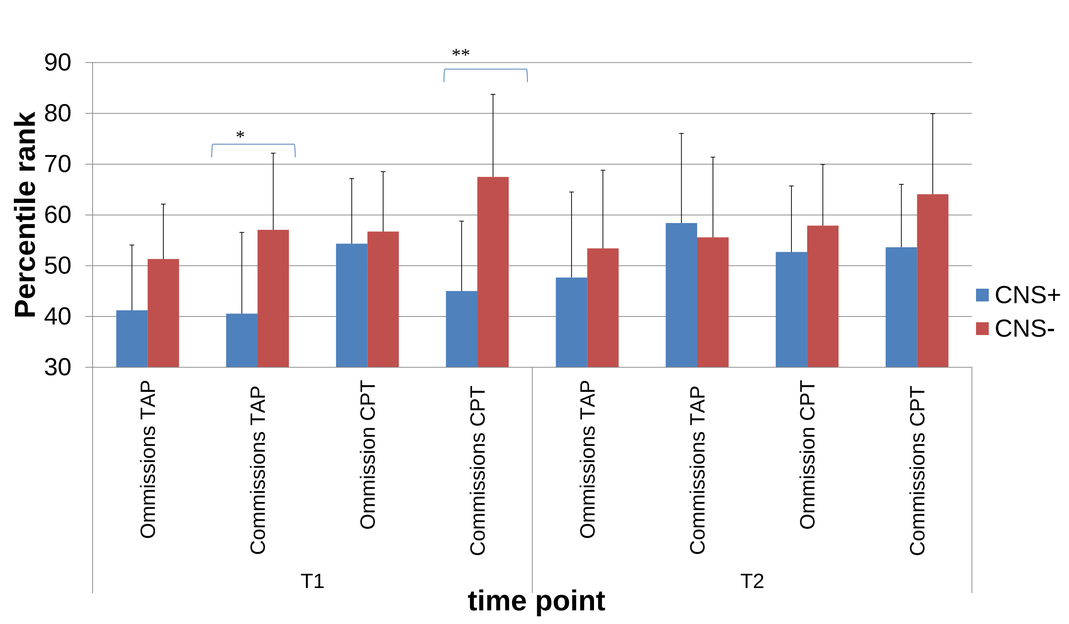
Function	Tests	Measure
Working Memory	WISC-IV	Working Memory Index
Processing Speed		Processing Speed Index
Fluid Intelligence	TONI - 3	Nonverbal IQ
Verbal Learning	RAVLT	Learning (PR)
		Recognition (PR)
	CMS Stories	Immediate Recall (PR)
		Delayed Recall (PR)
Selective Attention	CPT II	Commission Errors (PR)
		Omission Errors (PR)
Divided Attention	TAP	Commission Errors (PR)
		Omission Errors (PR)

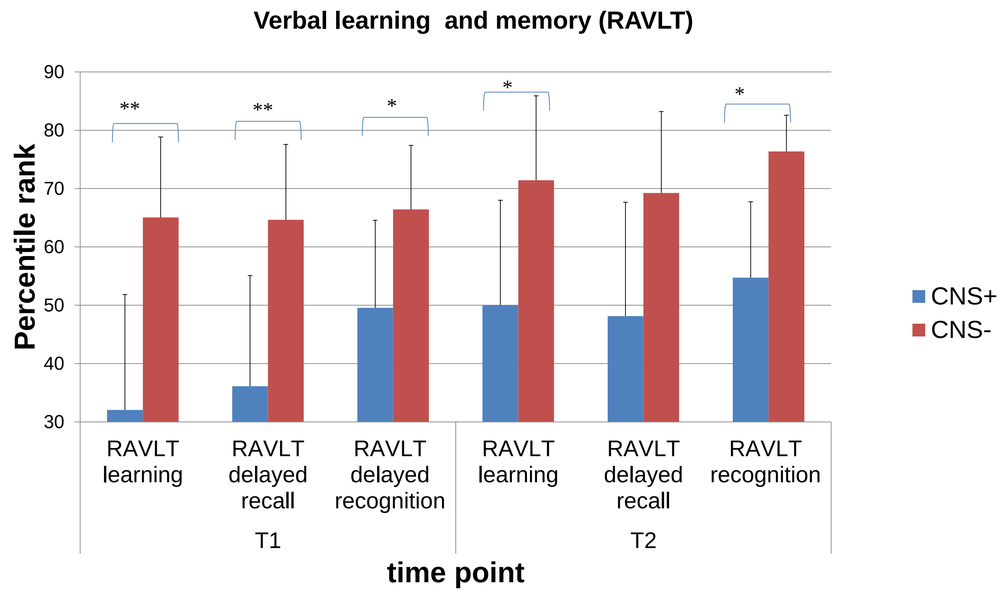
Note. PR= percentile rank. Additional tests at T1: WISC Intelligence, WISC verbal comprehension, WISC perceptual reasoning

Clinical & study protocol



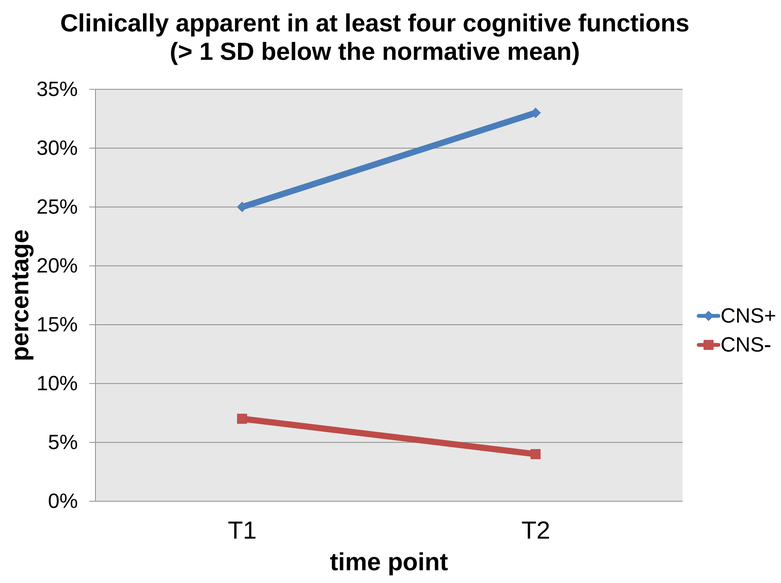
Results





(* = p<0.05; ** = p<0.01)

- No significant group x time interactions were found in longitudinal section comparisons (T1-T2).



Discussion

The findings of this study indicate a variety of functional deficits in children with brain tumors are already present before any surgical treatment. The surgical excision of the tumor in particular does not appear to cause a worsening of the preexisting functional deficits. On the contrary, tumor removal may be followed by an improvement in the defective performances in a significant proportion of cases. However, children with brain tumor who already perform in an impaired range at T1 seem to be those most vulnerable to further cognitive sequelae caused by therapeutic interventions. Thus, there is a need for cognitive assessment and intervention in children with BT as early as possible in the treatment process to minimize long-term cognitive deficits.

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